CARLO GAVAZZI SPACE SpA

0 CERN MIT L3 A&C/AMS

AMS02-PDS

NON CONFORMANCE REPORT

1 NCR ref: Doc.N°: NCR-PDS-CGS-C-133; Rev.: 1; Date: 19-03-2009; Page 1 of 2; attach: Annex A, B

2 NCR Title: ESEM 3-A Limitation time

IDENTIFICATION

3 Supplier	4 Purchase Order N°.	5 Model	6 Subsystem	7 Procedure/Work Item N°
CGS	N.A.	PFM	N.A.	N.A.

8 NC ITEM Identification	9 Drawing N°. Rev.	10 P.N. / C.I. N°	11 Serial N°
AMS02 Power Distribution System Assembly	10-AMS02PDS-000.00 /	10-AMS02PDS-000.00 / PDS18	FM01
12 Next Higher Unit Id.	13 Drawing N°. Rev.	14 P.N. / C.I. N°	15 Serial N°.
NA	NA	NA	NA

DESCRIPTION

16 NON CONFORMANCE Detected During:
RECEIVING INSP. ☐ MANUFACT. ☐ ASSEMBLY/INTEGRATION ☐ FINAL INSPECTION ☐ TEST ☒ OTHER..... ☐

17 Initiator, Dept., Date, Signature: A. Albertin, Technical directorate, 19-3-09

18 Description of NON CONFORMANCE

During reduced thermal test foreseen by NCR-PDS-CGS-C-129, the following problem has been observed:

- At high temperature (+53°C) the duration of current limiting phase, during short circuit test, exceeds the specified lower limit (5ms<Tlim<8ms). See Annex A for details

This behaviour is measurable to all outlet from 1 to 8 to all ESEM3-A boards.

19 Requirements violated

AMS-RQ-CGS-002 is.1 Par.: 3.2.3.8

INTERNAL NRB DISPOSITIONS

20 INTERNAL NRB Dispositions:

See next page

21 Verifications

22 Suspected cause of NC: HANDLING ☐ TRANSPORTATION ☐ TEST EQUIPMENT ☐ TOOLS ☐ SW ☐ DESIGN ☒
OPERATOR/PROCEDURE ERROR ☐ PART ☐ MATERIAL ☐ PROCESS ☐ TEST ☐ OTHER..... ☐

23 Classification: MINOR ☐ MAJOR ☒

Corrective/Preventive Actions: NONE 24

25 REQUEST FOR WAIVER: YES ☒ NO ☐ N° PDS-WV-CGS-001 Is. 1

26 Analysis Required: YES ☐ NO ☒ N°

27 Other related documents: NONE

Department:	28 P.A.	29 Syst. Engineering	30 PM	30	31 C.C.
Name:	Francini E.	Alfe S.	OLIVIER M.		Cinquepalmi C.
Signature:					
Date:	19/03/09	19-3-09	19/03/09		19.03.09

CUSTOMER/HIGHER LEVEL CONTRACTOR NRB DISPOSITIONS

32 CUSTOMER/HIGHER LEVEL CONTRACTOR NRB Dispositions (Class Major Only):

21 Verifications

33 Finally determined Cause of NC

34 Corrective/Preventive Actions:

35 Customer/HLContractor Approval:

36 CLOSE OUT CERTIFICATION

Department:		ASI-PA	ASI-PM	CGS PA/QA	PA/QA Stamp
Name:	Michael Capell	FRANCESCO RANCATI	E. RUSSO	E. FRANCINI	C.G.S.
Signature:					
Date:	9/4/09	22-4-09	23-04-09	23/04/09	

CARLO GAVAZZI SPACE SpA	0 **AMS02-PDS**	1 NCR ref	Doc.Nº : **NCR-PDS-CGS-C-133**
	NON CONFORMANCE REPORT		Rev.: **1** Date: **19-03-2009**
			Page 2 of **2** attach: **Annex A, B**

37 **CONTINUATION SHEET**

☐ SUSPECTED CAUSE OF NC	☒ INTERNAL NRB DISPOSITION	☐ DESCRIPTION OF NC
☐ FINALLY DETECTED CAUSE	☐ CUSTOMER NRB DISPOSITION	☐ CORRECT/PREVENT. ACTIONS
☐ REQUIREMENTS VIOLATED		

In order to reduce the temperature sensitivity of the over current circuits, a study for the individuation of the most temperature sensitive components is required. These components needs to be substituted with less temperature sensitive components. A thermal test should be repeated. These operations could have major impact on project schedule and there is risk of damage to the FM hardware.

Proposed solution: to extend the limitation time range to 4.5ms<T<6.5ms.

The lower limit of the limitation time impacts on the outlet capability to power, without intervention, a capacitive load. While the upper limit impacts on the mosfet junction temperature reached during current limitation.

Lower limit analysis: this change does not generate problems for the connected loads. From PDS FM DESIGN REPORT (PDS-TN-CGS-009 is.1 Par. 4.5.2.6) the maximum loads capacity for ESEM 3-A outlets from 1 to 7 is set to Cload_max = 250uF with a current limitation time of 3mS. For outlet 8 the maximum load capacity is set to Cload_max = 750uF F with a current limitation time of 3mS. Margin is present while setting the new lower limit to 4,5ms.

Upper limit analysis: for the new upper limit (6.5mS), considering an operative temperature of 80°C, the expected junction temperature of the JANTXV2N7236 power MOSFETs (which are used to limit the current for outlets form 1 to 7) should reach 120°C. This value is 30°C lower than maximum temperature declared on reference specification MIL-PRF-19500/595. For outlet 8 the junction of used power MOSFET JANSR2N7426 should reach a temperature around 105°C which is 45°C lower than maximum temperature declared on reference specification MIL-PRF-19500/660.

Conclusion: From the above analysis no problem are expected modifying the required limitation time range.

CGS proposes to discuss on a NRB feasibility of a waiver to avoid any hardware modification and increase the tolerance of the current limiters time duration.

1) Perform teleconf NRB CGS with ASI on 26/03/2009.

Conclusion: Collaboration declares that there are not impacts at system level, see Annex B, to modify the time limitation tolerance.
A Waiver shall be issued.

2) Issue the Waiver.

Use as is.

21 **Verifications**

1) SEE ANNEX B

2) CLOSED 07/04/09
SEE PDS-WV-CGS-01
Is. 1

Annex A to NCR-PDS-CGS-C-133 page 1 of 1

During short thermal test at high temperature (+53°C) the duration of current limiting phase during ESEM 3-A short circuit test exceeds the specified limit . See next comparative table.

Outlet	Current limitation Limit	Current limitation value (A)	Current limitation time Limit	Current limitation time(mS)
E3A-1 Out1 TPD3	6.5A ± 10%	6	5ms<T<6ms	5
E3A-1 Out8 TTPD_R	13A ± 10%	12,4	5ms<T<6ms	4,96
E3A-2 out 1 ER1_N	6.5A ± 10%	6,4	5ms<T<6ms	4,88
E3A-2 Out8 CAB_R	13A ± 10%	12,6	5ms<T<6ms	4,84
E3A-3 out 1 TPD0	6.5A ± 10%	6,2	5ms<T<6ms	4,96
E3A-3 out 8 CAB_N	13A ± 10%	12,4	5ms<T<6ms	4,92
E3A-4 out 1 JPD_R	6.5A ± 10%	6	5ms<T<6ms	4,92
E3A-3 out 8 TTPD_N	13A ± 10%)	12,2	5ms<T<6ms	4,92

Tab. 1: Section A TRP=53°C over current protection

For every ESEM 3-A of section A two outlets have been tested. This problem has been verified for all the ESEM 3-A of this section. The same happens for the ESEM 3-A located on section B, as shown in next table.

Outlet	Current limitation Limit	Current limitation value (A)	Current limitation time Limit	Current limitation time(mS)
E3A-1 Out1 TPD3	6.5A ± 10%	6,4	5ms<T<6ms	4,88
E3A-1 Out8 TTPD_R	13A ± 10%	12,8	5ms<T<6ms	4,92
E3A-2 out 1 ER1_N	6.5A ± 10%	6,4	5ms<T<6ms	4,92
E3A-2 Out8 CAB_r	13A ± 10%	13,0	5ms<T<6ms	4,92
E3A-3 out 1 TPD0	6.5A ± 10%	6,4	5ms<T<6ms	4,92
E3A-3 out 8 CAB_N	13A ± 10%	12,6	5ms<T<6ms	4,72
E3A-4 out 1 JPD_R	6.5A ± 10%	6,6	5ms<T<6ms	4,92
E3A-3 out 8 TTPD_N	13A ± 10%	13,0	5ms<T<6ms	4,88

Tab. 2: Section B TRP=53°C over current protection

ANNEX B TO NCR-PDS-CGS-C-133

pg 1/1

Da: Mike Capell [mailto:Michael.Capell@cern.ch]
Inviato: venerdì 27 marzo 2009 15.54
A: molivier@cgspace.it; Marchetti Ernesto; salia@cgspace.it; efrancini@cgspace.it
Cc: rgrossi@cgspace.it; plorenzi@cgspace.it; mmolina@cgspace.it; r.battiston@tiscali.it; Russo Enrico
Oggetto: RE: PDS NRB for NCR-PDS-CGS-C-128(M)-129(M)-131(M)-133(M) MINUTE WITH ACTIONS

Max,

For NCR-120, -128, -129, OK, I am ready to sign.
For NCR-131, -133, I confirm: No impact at system level. I am also ready to sign these NCRs.

-Mike.

Mike Capell +41 22 767 4706

From: Massimiliano Olivier [mailto:molivier@cgspace.it]
Sent: Friday, 27 March 2009 10:53
To: molivier@cgspace.it; Mike Capell; 'Marchetti Ernesto'; salia@cgspace.it; efrancini@cgspace.it
Cc: rgrossi@cgspace.it; plorenzi@cgspace.it; mmolina@cgspace.it; r.battiston@tiscali.it; 'Russo Enrico'
Subject: PDS NRB for NCR-PDS-CGS-C-128(M)-129(M)-131(M)-133(M) MINUTE WITH ACTIONS

Dear All,

In the following the decision and actions are proposed by CGS and ASI during the NRB:

NCR-120: Ncr needs only formal closure. CGS to collect signatures from AMS and ASI
NCR-128: Ncr needs only formal closure. CGS to collect signatures from AMS and ASI
NCR-129: Ncr needs only formal closure. CGS to collect signatures from AMS and ASI

NCR-131: AMS to confirm that the proposed NCR closure do not impact the AMS functionality at system level.
Upon positive AMS confirmation the NCR shall be closed without a waiver .

NCR-133:AMS to confirm that the proposed NCR closure do not impact the AMS functionality at system level.
Upon positive AMS confirmation
A DCN shall be issued to modify the requirement values in the PDS specification and the NCR shall be closed without a waiver .

We kindly ask Mr. Capell, that could not attend the telecom due to a last minute urgency, to review and reply to the proposal so that we can proceed with actions on our side.

Best Regards

Massimiliano